

On account of this Prof. Bessey proposes for them collectively the name "Carpus," and individually that of "Carpallary cells," because the relation they bear functionally to the pappus is so nearly like that of the carpus to the phalanges.

I would also suggest that the little ring spoken of is a portion of the calyx, for all the species of *Lactuca* examined have a beak or projection to the calyx. This is wanting in the Thistle, or rather has been reduced to a rudimentary form in the shape of this minute ring.

The "Thistledown" or pappus treated of in this article is simply that of *Cnicus altissimus*—our common purple thistle; but its form is characteristic of the genus *Cnicus*. Formerly thistles were placed under *Cirsium*, and *Cnicus* was called a subgenus, but Bentham and Hooker, in their "Genera Plantarum" have made two distinct genera, taking the different forms of pappus as the ground of distinction. *Cirsium* contains those thistles having barbed pappus, or like the early stage which I have described, while *Cnicus*, or the true thistles, have plumose pappus.—MINNIE KNAPP, Ames, Iowa.

GENERAL NOTES.

The Fig and the Caprifig.—The relation existing between the wild and cultivated figs has long been a puzzle, and has been variously explained. Graf Solms considers them as two races under one species. Gasparrini describes them as distinct genera. Fritz Müller thinks they are simply male and female plants, and to this view botanists are inclining. The fact that the presence of the caprifig was needed for the best development of the fig, and that the former was inhabited by an insect which visited the latter if possible, has long been known. The operations of this insect are very interesting, and are given in *Nature*, by W. B. Hemsley, as follows:

"The insect that operates in this manner is a small hymenopter, the complete annual cycle of development of which takes place within the three crops of fruit of the caprifig, whilst only one generation visits the fig, and that, as will be seen, to no advantage to the insect itself. In order to render what follows easily understood, we will give the present Neapolitan names of the three crops of the caprifig. The fruits that hang through the winter and ripen in April are called *manne*. These are followed by the *profichi*, which ripen in June, and the *mannoni*, which ripen in August and September. If we closely examine the *profichi* when fully ripe in June, we see here and there a black-winged insect emerging from the orifice at the top, its hairy body dusted over with pollen grains that have adhered to it in its passage through the zone of male flowers. And if we cut open one of these fruits, we find a considerable number of

these insects, all striving to find the way out. These are females, and associated with them are some helpless wingless males, and very often a number of a slender ichneumon as well. The female of this generation visits not only the *mammoni*, but also the fruits of the fig, if there are any at hand, in order to deposit her eggs. Now, the remarkable fact in connection with this, is that she is able to do so effectually in the *mammoni*, but not in the edible fig, though she succeeds in penetrating the fruit far enough to convey pollen to the female flowers, perishing in the act. Furthermore, the generation of the insect that develops in the *mammoni* deposits eggs in the *mamme*, and the generation proceeding therefrom finds an asylum for its progeny in the *profichi*."

Prof. Solms says that the eggs must be deposited within the integuments of the ovule itself, or they will not develop. The ovipositor is thrust between the branches of the stigma, down the pollen channel of the style into the ovary, and into the solitary ovule itself.

Classification of Plants.—Mr. Lester F. Ward, in a recent lecture at the National Museum in Washington, proposed the following scheme of classification, which he claims is the nearest approach yet made to a natural system, and upholds it mostly upon paleontological grounds:

Cryptogams ..	{	Cellular.	{	Filicineæ.....	{	Filices.	
		Vascular		Lepidophyte.....		Rhizocarpeæ.	
Phenogams....	{	Gymnosperms...		Cycadaceæ.	{	Equisetineæ.	
				Coniferaæ.		Lycopodiineæ.	
				Gnetaceæ.		Ligulate.	
	{	Angiosperms		Monocotyledons.	{	Apetalæ.	
Dicotyledons.....				Polypetalæ.			
						Gamopetalæ.	

The Effects of Moisture on Pine.¹—Ten pieces one inch square by ten long were selected from a piece of pattern pine that had been "in the dry" for six or seven years. Inasmuch as this is the driest class of commercial pine, the results are more satisfactory and conclusive. The pieces were numbered consecutively, and two were taken for each experiment to obtain a mean result, and avoid error as much as possible. Nos. 1 and 2 were placed in a drying oven in the chemical laboratory, and kept at a temperature of 100° C. Nos. 3 and 4 were placed in moist air; and Nos. 5 and 6 immersed in water. Nos. 7 and 8 were exposed to the ordinary atmospheric changes. Nos. 9 and 10 were made into shavings, and placed in the oven for perfect drying. Each piece was carefully weighed and measured once in twenty-four hours. (Experiment lasted 14 days). The average weight of each piece at the beginning of the experiment was 63 grams, or 6.3 grams per cubic inch. The tabulated results show: I. That there was a marked difference in the weight of some of the pieces, those being heavier that were situated near the center of the tree. II.

¹Abstract of a paper read before the Scientific Society of Purdue University, by Philip S. Fitzgerald, class of '85.

that the dried blocks (1 and 2) had lost 9.5 % of their original weight. III. That the moist air blocks (3 and 4) had gained 3.9 % in weight. IV. That the wet pieces (5 and 6) had absorbed 62.25 % of their own weight of water. V. That the ordinary air pieces (7 and 8) had undergone practically no change. VI. That the shavings (9 and 10) had lost only 7.9 %, or less than the blocks 1 and 2. VII. That the increase and decrease in width was very much more marked in the direction of the annual rings than in the direction of the medullary rays. VIII. That the greatest increase in width was $\frac{1}{10}$ of an inch, which was from fifty to sixty times greater than the increase in length; and IX. That the increase in size was not proportional to the gain in weight.

Rhododendron (Azalea) Vaseyi, Gray in Proc. Am. Acad., xv, 48. 1879.—Having been favored with notes upon the living plants and both flowering and fruiting specimens of this interesting shrub, from my obliging friends Mr. Canby and Mr. J. Donnell Smith—the latter sending abundant specimens both of this year's blossoms and of last year's fruiting—I propose to amend the published character, which was drawn up from young Mr. Vasey's original specimens.

First, as to the flower buds. I described these as with "*perulis paucis*," but summer specimens with formed flower buds for the next year have well imbricated bud-scales. The outer and shorter bracts fall as the bud opens, the thin innermost remaining longer, which led to the mistake. Maximowicz makes a similar mistake in respect to *R. Rhodora*.

Next, the blossoming is precocious rather than coëtaneous with the leafing. Vasey's specimens, with flowers ready to fall, have leaves an inch and a half long. Those sent by Mr. Smith, which were gathered at the middle of May by Mr. S. Kelsey, are either leafless, or the more advanced plants just developing a pair of leafy branches from just under the flowering bud.

In the third place, the corolla is irregular in a bilabiate way, thus confirming its relationship to *R. Rhodora*, however different in habit. Maximowicz takes notice of this bilabiation in two N. E. Asiatic species. It is 5-parted or nearly, but the lateral sinuses are deeper, and three of the divisions more connected than the other two. Mr. Canby notes that the three divisions of what may be called one lip, are shorter than the other two, and so it is in a corolla received from him; but in numerous dried specimens this is not so apparent. But the *spread* of the divisions is decidedly irregular, three seemingly ascending and two recurved-spreading. The upper corolla-lobes are more or less spotted inside toward the base; in some flowers the spots are dark and conspicuous.

In the fourth place, the stamens are prevailingly seven, quite unequal, three or four of them larger and with stouter filaments. I had described them as five, and this is true of some flowers. In one flower I find only four, three large and one depauperate. The ovary is beset with stipitate viscid glands. I had described the capsule as glabrate (not glabrous), which is not far out, but it is roughish with the vestiges of the bristly glands. Mature leaves are from obovate-oblong to oblong-lanceolate, acute or acuminate at both ends, the larger four to six inches long.

A. GRAY.

Notes from California.—1. The rare *Streptanthus heterophyllus* ranges from Temecula Cañon to San Rafael, Mexico.

2. There are all sorts of transitions between *Lepidium Menziesii* and *L. lasiocarpum*, and as Watson has united *lasiocarpum* and *Wrightii*, it is probable that this will follow. The number of stamens varies from two to four in each, while the flattened pedicels vanish, and the pods are smooth or pubescent.

3. *Lepidium nitidum* ranges throughout S. California and N. Mexico. The seeds hang from the base of the style.

4. *L. dictyotum* and the var. *acutidens* occur on the Temecula plains, and the latter also at San Diego. The typical form has been supposed before to be confined to central Nevada, and the variety was not known from S. California.

5. I have three forms of *Thysanocarpus curvipes*; *a.* Leaves runcinate, stamens conspicuously exerted, petals not surpassing the sepals, auricles short or almost none, pods rounded. *b.* Leaves lyrate, auricles long, pods obtusely pointed, stamens and petals as in *a.* *c.* Stamens short, petals surpassing the sepals, leaves lyrate. All these forms have the peculiar hairs of *T. curvipes*.

6. *Thalictrum Fendleri* grows in Temecula Cañon.

7. A peculiar form of *Clematis ligusticifolia* abounds north of San Francisco, having both perfect anthers and sterile filaments on the pistillate plant, thus making it perfect. The leaves differ somewhat also, but Mr. Watson regards it as *C. ligusticifolia*.

8. *Viola pedunculata* ranges throughout S. California into Mexico as far as Eucenada.

9. *Rhamnus croceus* varies much. The stamens are oval to oblong; calyx lobes lanceolate, acute; petals sometimes wanting.

10. The horns of *Ceanothus crassifolia* are broadly ovate and very short, while those of *C. cuneatus* are often linear.

11. The petals of *Cneoridium dumosum* are four times as long as the calyx. This hitherto rare plant, along with *Adolphia California*, one equally rare, ranges south along the coast to Eucenada, Mexico. The latter is much more common further south.

12. *Astragalus tener* is now to be found in S. California at Soledad, near San Diego.

13. The coast plant *Boykinia occidentalis* is not uncommon in the Sierras at Emigrant Gap.

14. *Psoralea physodes* is abundant in the mountains at Los Angeles.

15. *Hosackia decumbens*, var. *Nevadensis*, is not annual and has no claim to exist as a variety, as the characters given do not hold good.

16. *Hosackia maritima* is either pubescent or smooth, and even fleshy, and extends far into Lower California.

17. The leaflets of *Vicia Americana*, var. *truncata*, are often deeply emarginate.

18. *Sambucus bipinnatifida* ranges south at least to Eucenada, Mexico.

MARCUS E. JONES, Salt Lake City.

Galinsoga parviflora, a nettle-like Composite from S. America, is abundant and fully established along the streets and in neglected gardens near Union Park, in Chicago.—J. C. A.

Notelets.—It is well known that the milkweeds (*Asclepias*) often catch insects in their flowers. In the Botanic Garden at Cambridge I have frequently seen small moths hanging by their proboscides to certain foreign *Asclepiads*. The other day I found our common little red butterfly (*Lyceus Americana*, Harris) entangled in the same way by the flowers *Asclepias Cornuti*, Decaisne.

The same day I was attracted to two fine specimens of the *Argynnis* butterfly on one of the swamp thistles. I wondered why they were so quiet. Examination revealed a spider of almost the exact colors of the involucre scales. He had already sucked dry one specimen and was at work on the other.

I have frequently, in New Brunswick, observed gigantic *single* specimens of *Habenaria fimbriata*, R. Br. It remained for Rhode Island to show me a group of a dozen or more of these elegant plants together. I found them, a few days since, near Buttonwoods, Warwick, R. I., growing in a deep, woody hollow, near a stream. It was a sight to always remember.—W. WHITMAN BAILEY.

Sarcodes sanguinea.—The *Gardeners' Monthly* contains the following on the Snow Plant (*Sarcodes sanguinea*), by Thomas Meehan, "as the result of many examinations, to be an annual, germinating on small pine roots and subsequently obtaining subsistence from the earth, as do *Aphyllon* and *Epiphegus*."

I very much doubt the correctness of this statement, and as truth should be the object of all investigation, I give the result of some of my observations, made during a residence of seventeen years in the home of *Sarcodes*, and invite farther inquiry from those who are interested.

My attention was first called to the peculiar growth of *Sarcodes* as early as 1865, by a plant brought me by a brother, who was working in a hydraulic mine at the time (he had piped it out). The under-ground stem measured three feet, and a part was broken off. It is a common saying among the miners that "the roots of the 'Snow Plant' have no end."

During the years 1875 and 1876 my attention was more particularly given to the growth of *Sarcodes*, to ascertain if it was really a parasitic plant, and from what roots it drew its nourishment.

The under-ground stem is covered with thick, fleshy leaves (or scales), and in the axil of each leaf is an undeveloped flower bud. The stem, in the smaller plants, extends down only a few inches, while in the larger ones it reaches a depth of three feet or more. The root consists of a coralline mass, which contains from one to more than one hundred cubic inches, according to size and age of the plant. The descending axis is attached to this mass by short, brittle roots, about one inch in length.

I have dug dozens of these plants, and at all seasons of the year. Always found the coralline mass greatest about the time they began to appear above the ground in early spring. It is gradually absorbed in growing, leaving a honey-combed appearance in the soil. When the growth for the season is completed, there only remains about one cubic inch of the mass, and just *below* and a little to one side of the old under-ground stem, and attached to the mass of root, is a little "snow plant."

In the spring of 1878, I marked the place of growth of a number of these plants, as I had promised roots of them to Mr. Elwees, of England, and friends

in the East, who wished to try to grow them. I dug some of these plants in November, after the rains had commenced, and discovered that the root mass and little plantlet had greatly increased in size. I dug some of the staked plants early in March, and found them still progressing in growth, and others that were not dug came up and bloomed by the stakes.

My conclusions are, that *Sarcodes* is an herbaceous perennial, continuing through many years, and, by the little plantlet *always* being found *below* the older one, that it descends a little deeper into the earth each season, and this accounts for the great depth to which some of the under-ground stems penetrate.

As to the germination and infant life of *Sarcodes* I know nothing, but am satisfied that they receive their nourishment from the earth after they attain any considerable size.—MRS. R. M. AUSTIN.

New Indiana Plants.—Four species have just been added to the list of known Indiana plants, viz: *Asclepias phytolaccoides*, growing abundantly in the college grounds at Wabash College, Crawfordsville; *Habenaria orbiculata*, Avilla, Ind.; *Epilobium angustifolium*; and *Sambucus pubens*.

EDITORIAL NOTES.

PROF. BUREAU has been appointed Director of the *Jardin des Plantes* in place of the late M. Decaisne.

PROF. LUCIEN M. UNDERWOOD has been elected Professor of Geology, Zoölogy, and Botany in Syracuse University.

THE DEPARTMENT OF AGRICULTURE report for 1881-2, contains some interesting matter pertaining to bacterial subjects, illustrated with several colored and uncolored plates.

THOMAS J. HOWELL, in *Pop. Sci. Monthly*, shows that N. Am. plants can be divided into three or four distinct floras, corresponding to the different geological formations they inhabit.

EXTENSIVE PREPARATIONS are being made by the Chicago scientific public for the American Association of Microscopists, which holds its annual meeting in that city from August 7 to 10. A large attendance is anticipated.

THE LIBRARY OF PROF. J. DECAISNE, probably one of the finest in Botany, Horticulture and general Natural History sold since Jussieu's time, was sold in Paris last month. The catalogue, containing a portrait of Decaisne, and a bibliography by Bornet, covered 480 pages.

IT IS TO BE HOPED that there will be a large attendance of botanists at the A. A. S. meeting at Minneapolis, beginning August 15th. No better place for botanists could have been selected, and every moment can be made pleasant, not only in exploring new ground, but in that congenial companionship which the western worker, particularly, is denied during the greater part of the year. The biological section under Prof. Beal ought to be of great interest, and botanists should make a strong rally to its support.